

Claims

1. An unmanned dispensing station for laboratory items, comprising:

- 5 - an input terminal for identifying a user and authenticating said user;
 - a central processing unit connected to said input terminal;
 - an output unit comprising a sensor device connected to said central processing unit;
 - a memory device connected to said central processing unit; and
10 - a communication interface for transceiving data, connected to said central processing unit;

wherein said output unit comprises a locking mechanism to unlock said output unit for access of an authorized user and to close and lock said output unit to prevent unauthorized access,

wherein said output unit comprises at least a first group of laboratory items arranged in a first order, wherein at least one item of said first group is located in a dispensing position, to be
15 withdrawn from said output unit by said user,

wherein said sensor device is positioned in the vicinity of said dispensing position to detect a withdrawal,

wherein said memory device is adapted to store dispensing transaction data comprising the identity of said authorized user and the item group of said item, as well as withdrawal timing
20 information,

wherein said central processing unit is adapted to control said locking mechanism to unlock said output unit upon successful authentication of said user, and to close and lock said output unit upon termination of a dispensing transaction, wherein said central processing unit is adapted to read dispensing transaction data from said memory and to send it to said

25 communication interface.

2. Dispensing station according to claim 1, wherein said input terminal comprises:

- an access device for accepting a personal identification module of said user, wherein said
 access device is adapted to read personal authentication data stored on said personal
30 identification module, to compare it with user authentication data stored in said memory
 device and to issue an authentication signal to said central processing unit upon matching
 of said read and said stored data.

3. Dispensing station according to claim 2, wherein said access device is adapted to lock said personal identification module during a dispensing transaction, and to release said personal identification module for removal by said user only after said locking mechanism has locked said output unit subsequent to the termination of a dispensing transaction.
4. Dispensing station according to claim 1, wherein said access device comprises an output section adapted to write dispensing transaction data to said personal identification module.
5. Dispensing station according to claim 1, wherein said input terminal comprises:
- a scanning device for scanning biometrical data of said user, adapted to compare said data with biometrical user data stored in said memory device and to issue an authentication signal to said central processing unit upon matching of said scanned and said stored data; wherein said biometrical data is selected from the group containing fingerprint, eye iris, face image and voice data.
6. Dispensing station according to claim 4, wherein said input terminal comprises:
- a display for displaying user instruction and dispensing status information; and
 - an input device for entering a personal identification code of said user;
- wherein said access device is adapted to transfer said personal identification code to said memory device, and said output section is adapted to delete any personal identification code stored on said personal identification module.
7. Dispensing station according to claim 1, wherein said output unit comprises a refrigerating or freezing device for cooling or freezing of items comprised in said output unit, wherein at least all said laboratory items are contained in said refrigerating or freezing device, and wherein said refrigerating or freezing device may comprise a plurality of zones with different temperatures or one or more zones with a temperature gradient.
8. Dispensing station according to claim 1, wherein said input terminal comprises a printer adapted to print out dispensing transaction data.

9. Dispensing station according to claim 1, wherein said communication interface comprises a wireless communication module for wireless transmitting of said dispensing transaction data to at least one destination address.
- 5 10. Dispensing station according to claim 9, wherein said wireless communication module comprises a transmission section for preparing and sending an electronic mail containing dispensing transaction data to at least one destination address.
- 10 11. Dispensing station according to claim 9, wherein said wireless communication module comprises a transmission section for preparing dispensing transaction data for transmission to a web site.
12. Dispensing station according to claim 9, wherein said wireless communication module comprises a transmission section for preparing and sending a short message (SMS) containing dispensing transaction data to at least one phone number.
- 15 13. Dispensing station according to claim 1, wherein said output unit comprises at least one movable tray adapted to be displaced between said dispensing position in which said tray is aligned with said order of said group of items to receive one of said items, and a removal position in which said tray is positioned to enable said user to remove an item.
- 20 14. Dispensing station according to claim 9, wherein said wireless communication module comprises a receiving section for receiving restocking data comprising an item identification and an amount of reloaded items, wherein said receiving section is adapted to transmit said restocking data to said central processing unit for updating the content of said memory device according to said restocking data.
- 25 15. Dispensing station according to claim 13, wherein said output unit comprises at least two trays, and said locking mechanism is adapted to selectively lock and unlock at least one of said at least two trays, and said central processing unit is adapted to control said selective locking or unlocking depending on said authorization of said user.
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16. Method for dispensing laboratory items, comprising:

- identifying and authenticating a user;
- unlocking an output unit for withdrawal of items by said authenticated user;
- 5 - sensing a dispensing transaction of said user;
- recording dispensing transaction data comprising the identity of said authorized user and the item identification, as well as withdrawal timing information;
- determining the termination of said dispensing transaction and locking said output unit; and
- 10 - transmitting said recorded dispensing transaction data to at least one destination address.

17. Method according to claim 16, wherein the termination of said dispensing transaction is determined by sensing that a predetermined period of time after unlocking of said output unit or a dispensing transaction has passed.

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18. Method according to claim 16, wherein the termination of said dispensing transaction is determined by sensing an indication of the termination entered by said user.

19. Method according to claim 16, comprising:

- 20 - storing the number of currently available items in said memory device;
- updating said number after the termination of a dispensing transaction according to said recorded dispensing transaction data; and
- transmitting a restocking request if said amount is less than a predetermined threshold amount.

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20. Method according to claim 16, comprising:

- outputting recorded dispensing transaction data by printing out or displaying said data.

21. Method according to claim 16, wherein said user is authenticated by:

- 30 - reading a personal identification module;
- comparing personal authentication data read from said identification module with previously stored authentication data; and

- issuing an authentication signal upon a match of the compared authentication data.

22. Method according to claim 16, wherein said personal identification module is locked during a dispensing transaction, and released only after said output unit has been locked subsequent to the termination of a dispensing transaction.

23. Method according to claim 16, wherein a personal identification code is received from said user and compared with a personal identification code stored on said personal identification module, wherein said authentication signal is issued only upon a match of both codes.

24. Method according to claim 23, comprising:

- recording said personal identification code upon a successful authentication; and
- deleting said personal identification code from said personal identification module.

25. Method according to claim 21, comprising writing dispensing transaction data to said personal identification module.

26. Method according to claim 16, wherein said user is authenticated by:

- scanning biometrical data of said user;
- comparing said biometrical data with previously stored biometrical data; and
- issuing an authentication signal upon a match of the compared biometrical data.

27. Method according to claim 16, comprising transmitting dispensing transaction data to a web site.

28. Method according to claim 16, comprising preparing and sending an electronic mail containing dispensing transaction data to at least one address.

29. Method according to claim 16, comprising preparing and sending a short message (SMS) containing dispensing transaction data to at least one phone number.

30. Method according to claim 19, comprising:

- receiving restocking data comprising an item identification and an amount of restocked items; and
- updating said number of available items.

5 31. Method according to claim 16, wherein said output unit comprises at least two trays for dispensing items, wherein said unlocking of said output unit comprises:

- selectively unlocking at least one of said trays depending on said authorization of said user.

10 32. Method according to claim 16, wherein said output unit comprises at least two trays for dispensing items, comprising:

- receiving an item selection from said user and unlocking at least one of said trays corresponding to said selection.

15 33. System for dispensing laboratory items, comprising:

- at least one dispensing station according to claim 1; and
- a computer system comprising at least one communication interface;

wherein said at least one communication interface is adapted to connect with said at least one dispensing station, to receive dispensing transaction data.

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34. Software tool comprising program code means stored on a computer readable medium for carrying out the method of anyone of the method claims 16 to 32 when said software tool is run on a computer or network device.

25 35. Computer program product comprising program code means stored on a computer readable medium for carrying out the method of anyone of the method claims 16 to 32 when said program product is run on a computer or network device.

30 36. Computer program product comprising program code, downloadable from a server for carrying out the method of anyone of the method claims 16 to 32 when said program product is run on a computer or network device.

37. Computer data signal embodied in a carrier wave and representing a program that instructs a computer to perform the steps of the method of anyone of the method claims 16 to 32.